

REMARKS

Claims 1-15 and 17 stand rejected in the Final Office Action mailed on July 14, 2006. With this Request for Continued Examination, submitted concurrently with a Petition for Revival of an Application for Patent Abandoned Unintentionally under 37 CFR 1.137(b), Applicants have amended claims 1, 4-10 and 15 to more particularly point out and distinctly claim the present invention. Specifically, claim 1 has been amended to recite "[a]n additive composition for a transmission oil comprising: (a) an oil dispersion of a hydrated potassium borate; and (b) an oil dispersion of hexagonal boron nitride; wherein the weight ratio of the hydrated potassium borate to the hexagonal boron nitride is in the range of about 2.1:1.0 to about 8.4:1.0." Support for this amended claim can be found in various places in the original specification, for example, at page 5, lines 29-30. Moreover, claims 2 and 3 have been canceled without prejudice or disclaimer, and claim 4 has been amended to depend from claim 1. Claims 4-10 depend from claim 1, having been amended to recite "potassium borate" instead of "alkali metal borate." These amendments likewise find support in the original specification. Claim 15 has been amended to recite a lubricating oil composition comprising the additive composition of the amended claim 1, again reciting "potassium borate" instead of "alkali metal borate," and reciting a weight ratio of the hydrated potassium borate to the hexagonal boron nitride of about 2.1:1.0 to about 8.4:1.0. This amendment is likewise supported by the original specification, for example, at page 5, lines 29-30; page 15, line 20, to page 16, line 14; and page 16, line 20, to page 18, line 10. No new matter has been introduced.

In view of these amendments and the remarks herein, Applicants respectfully request the Examiner's reconsideration and reexamination of the application.

1. Claim Rejections – 35 U.S.C. § 103

Claims 1-7, 10-12, 14-15 and 17 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Salentine (U.S. Patent Number 4,717,490) in view of Kawabata *et al.* (U.S. Patent Number 5,173,202) and Hawley's Condensed Chemical Dictionary.

Applicants respectively traverse. Salentine discloses a lubricating oil containing alkali metal borate-containing lubricants (Col. 1, lines 8-10). In particular, hydrated particulate alkali metal borates are said to have the formula $M_2O \cdot mB_2O_3 \cdot nH_2O$, where M is an alkali metal including sodium and potassium, m is a number from 2.5 to 4.5 (both whole and fractional), and n is a number from 1.0 to 4.8, wherein hydrated potassium triborate microparticles are preferred (Col. 1, lines 60-68 and Col. 2, lines 1-15). The mean particle size of the hydrated borate particles is said to be less than 1 microns (Col. 2, lines 12-15). The lubricating oil to which the borate is added is said to be any hydrocarbon-based lubricating oil or a synthetic base oil stock (Col. 4, lines 24-32), therein intrinsically including transmission oil of a lubricating viscosity. The alkali-metal borate of Salentine comprises 0.1 to 20 weight percent of the lubricant composition (Col. 4, lines 33-34). Other additives that may be added to the composition include dispersants (Col. 4, lines 53-62).

Kawabata *et al.* is drawn to a lubricant coating material made of ceramic particles, particularly zirconium oxide, mixed with lubricating oil. While a commercial boron nitride lubricant is used in automobile engine oil B of the Examples in Kawabata *et al.*, there is no indication in the Examples, or the entire disclosure of Kawabata *et al.*, that a hexagonal boron nitride was used. The Examiner cites Hawley's Condensed Chemical Dictionary as indicating that boron nitride has a "hexagonal plate structure." However, it is well known that boron nitride (BN) exists in at least four predominant forms or configurations – hexagonal (hBN), rhombohedral (rBN), cubic (cBN) and wurtzite (wBN). *See, e.g.,* Kirk-Othmer Encyclopedia of Chemical Technology, Fourth Edition, Volume Four, "Refractory Boron Compounds", pages 427-429 (copy previously provided). While Kawabata *et al.* discloses that boron nitride may be used in lubricating oils to reduce friction on metal surfaces, there is no teaching or suggestion that the boron nitride is hexagonal. Thus, there is nothing in the disclosure of either Salentine or Kawabata *et al.* that suggests combining the teaching of the references, and even if there was such motivation, the combination still does not teach or suggest the presently claimed invention.

Moreover, even assuming, *arguendo*, that the combined teaching of the primary and secondary references did establish a *prima facie* case of obviousness as alleged by the Examiner, there is nothing in the cited references that suggests that the combination of an oil dispersion of a hydrated potassium metal borate and an oil dispersion of hexagonal boron nitride in a specific ratio would provide a surprising and unexpected reduction in synchronizer sticking in a manual transmission gear oil. In particular, the

surprising and unexpected reduction in synchronizer sticking has been demonstrated in Table 1 below, which is taken from the Examples of the present specification.

Table 1

Sample	No. of Cycles with Cone on Ring Sticking	Total No. of Cycles	Anti-sticking coefficient
Base oil	5000	5000	0
Comparative Composition A	8100	8100	0
Comparative Composition B	6600	6600	0
Composition 1	1200	7500	0.84
Composition 2	1600	8710	0.82
Composition 3	300	10560	0.97

Comparative Composition A comprises an oil dispersion of hydrated potassium borate and base oil. Comparative Composition B comprises an oil dispersion of hexagonal boron nitride and base oil. Each of Compositions 1-3 comprises an oil dispersion of hydrated potassium borate, an oil dispersion of hexagonal boron nitride and base oil.

According to the data in Table 1, an additive composition of the present invention, which contains both the oil dispersion of hydrated potassium borate and oil dispersion of hexagonal boron nitride in a weight ratio of hydrated potassium borate to hexagonal boron nitride in the range of about 2.1:1.0 to 8.4:1.0, provides significant anti-sticking performance. That additive composition of the present invention also shows a marked improvement over the comparative compositions, which contain either the oil dispersion of hydrated potassium borate or the oil dispersion of hexagonal boron nitride

alone. This is clearly an unexpected result, which could not have been predicted from the teachings of the cited references.

Accordingly, withdrawal of the rejection of claims 1-7, 10-12, 14-15 and 17 under 35 U.S.C. § 103(a) over Salentine in view of Kawabata *et al.* and Hawley's Condensed Chemical Dictionary, is respectfully requested.

Claims 8, 9, and 13 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Salentine in view of Kawabata *et al.* and Hawley's as applied to claims 1-7, 10-12, 14-15 and 17 above, and further in view of Chrisope *et al.* (U.S. Patent Number 5,360,562).

Applicants respectively traverse on the following grounds. First, it is noted that Applicants' arguments above also effectively obviate the instant rejection. Moreover, while there is teaching of boron-containing ashless dispersant, there is nothing in Chrisope *et al.* that teaches or suggests either hydrated potassium borate or hexagonal boron nitride, or that the combination of hydrated potassium borate and hexagonal boron nitride, in the specific ratios currently claimed, would provide significant anti-sticking performance. Thus, the teaching of Chrisope *et al.* does nothing to overcome the deficiencies in Salentine, Kawabata *et al.* and Hawley's. Accordingly, there is nothing in the cited references that suggests the present invention as presently claimed.

Withdrawal of the rejection of claims 8, 9 and 13 under 35 U.S.C. § 103(a) over Salentine in view of Kawabata *et al.* and Hawley's as applied to claims 1-7, 10-12, 14-15 and 17 above, and further in view of Chrisope *et al.*, is thus respectfully requested.


Applicants note with appreciation the Examiner's acknowledgment of a terminal disclaimer filed on April 19, 2006.

In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is not rendered obvious in view of the prior art reference cited against it. Applicants thus request the entry of this Amendment, the Examiner's reconsideration of the application and the timely allowance of the pending claims.

The commissioner is requested and authorized to charge Deposit Account No. 03-1620 the filing fee of \$790 for this Request for Continued Examination and any other fees that may be due.

Respectfully submitted,

CHEVRON ORONITE COMPANY LLC

By: 
Wenfang Chen
Reg. No. 52,729
(925) 842-4664

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